Articles

The Greater Flamingo *Phoenicopterus roseus* still breeds in Dasht-e Nawar, Afghanistan

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Abstract
Dasht-e Nawar (altitude: 3150 m asl) located in the province of Ghazni, Afghanistan, was known since 1965 as the highest breeding site in the world for the Greater Flamingo *Phoenicopteus roseus*. Because of successive wars and civil turmoil the area could not be visited by scientists between 1979 and 2002. During the surveys we have carried out in 2007 and 2009 we confirmed for the first time since 1975 that the species still breeds in the area, with a maximum of 98 juveniles counted in August 2007. Our monitoring results and interviews of local inhabitants, however, suggest that the number of flamingos occurring in the area has decreased. In the absence of hunting and egg collection threats, the increasing diversion of inflowing waters in the main lake, for irrigation and human uses, seems to pose the greatest threat to the breeding colony of flamingos in the short term.

Introduction
The presence of large breeding colonies of flamingos in Afghanistan was first reported by Babur the Great (1483–1530). In 1504, on his way back to Kabul from an expedition in the Indus Valley, he observed that "when within one mile of Ab-e Estada […] something of a red appearance was seen, like the ruddy crepuscule, which again by-and-by vanished […]. When we came close up we discovered that this appearance was occasioned by immense flocks of wild flamingos" (Talbot, 1909). Ab-e Estada, a large saline lake located at 32°30'N–67°55'E, provided for centuries breeding grounds for the Greater Flamingo *Phoenicopterus roseus*. Unfortunately recent accounts have suggested this is no longer the case for a variety of reasons which include a chronic shortage of inflowing water diverted for irrigation, the continuous pumping of underground waters and a considerable increase in the number of local residents, many of whom are active waterfowl and flamingo hunters (UNEP, 2003).

In 1965, German zoologists G. and J. Niethammer (cited in Klockenhoff & Madel, 1970) found another large colony of Greater Flamingos, in Dasht-e Nawar (3150 m asl), a wetland located c. 130 km north of Ab-e Estada. Subsequently, the site was identified as the highest breeding haunt in the world for this species of flamingo, almost every year between 1969 and 1975 (Petocz & Habibi, 1975). However, after the beginning of the Soviet invasion in 1979, a long period of war started in the country and Dasht-e Nawar was no longer visited by scientists. It is only in September 2002 that a UNEP post-conflict environmental assessment mission could revisit the area. They found the lake basin dry and reported that the main lake had disappeared in summer for the past four years due to drought (UNEP, 2003). In April 2006 another mission counted up to 2,500 flamingos, but by the end of June the lake was dry and birds had vanished, failing to breed (Petocz, 2006). These alarming reports suggested that, like in Ab-e Estada, water diversion for irrigation and human uses might no longer allow flamingos to breed successfully in Dasht-e Nawar.

Study site
Dasht-e Nawar (33°50'N, 67°50'E) is located in the province of Ghazni, in Central Afghanistan (Fig. 1). It is an extensive high-altitude plain enclosed in the arid Koh-e Baba mountain range, an offshoot of the Hindu Kush. The area encompasses c. 600 km^2 of grass-meadow plain, mudflat, brackish ponds and lakes, the largest one, Ab-e Nawar being a shallow, alkaline water lake of approximately 35 km^2. Water supplies come primarily from spring snow melt in the surrounding mountains and from several

sources in the western part of the lake. Water level in spring is therefore almost entirely dependent on winter precipitations. Nogge (1974) believed that Ab-e Nawar water volume could typically drop from 20 million m^3 to 2 million m^3 between spring and fall because of evaporation.

Methods

We surveyed the area by car and foot in April and August 2007, and in July 2009. We counted flamingos between 5:30 and 10:30 in the morning using 10x binoculars, a 15/45x spotting scope and manual counters. Because flamingos gathered in only one to three large flocks it was easy to avoid duplicate counts. In August 2007 we also interviewed inhabitants of 49 households, all belonging to the predominant Hazara ethnic group, about recent history of flamingos and apparent threats in the area.

Results

In 2007, we recorded between 70 and 80 adult and immature Greater Flamingos on 28 April and 850 individuals, including 98 unfledged juveniles in one crèche, on 4 August, while we recorded on 29 July 2009 358 individuals including 20 unfledged juveniles and one adult Lesser Flamingo *Phoeniconaias minor*. Although the survey planned in summer 2008 had to be cancelled due to local insecurity, residents affirmed that large numbers of flamingos were present in the area that year. According to our questionnaire investigation, 75% of respondents considered the Greater Flamingo a salient feature of their environment and cultural patrimony, 49% of them supported that the species occurs in the area every year, but 80% of interviewees affirmed that their numbers have markedly decreased in the last 10 years or more, because of repeated droughts and chronic lack of water in the basin. Respondents mentioned that on rare occasions in the recent past, people from outside the area had attempted to capture several specimens alive.

Discussion

Thirty-two years after the last report of a breeding event (Petocz & Habibi, 1975) our surveys confirmed that the Greater Flamingo still reproduces in Dasht-e Nawar. Censuses carried out between 1969 and 1975

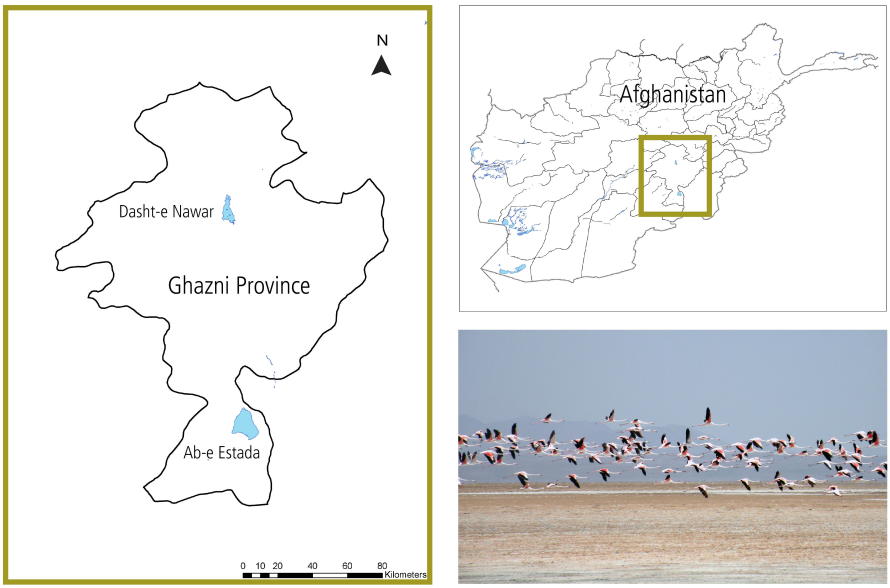

Figure 1. Maps of the location of Dasht-e Nawar and Ab-e Estada in Afghanistan. The flock of Greater Flamingos *Phoenicopterus roseus* was photographed in Dasht-e Nawar, 28 July 2009.

estimated spring/summer populations at 1,300–12,000 individuals with a maximum of 400 juveniles in 1975 (Petocz & Habibi, 1975). Spring/summer counts between 2006 and 2009 reported population sizes of 80 to 2,500 individuals with a maximum of 98 juveniles in 2007, suggesting in concordance with inhabitant's impression that the number of flamingos breeding in the area has decreased.

In western Asia, the Greater Flamingo breeds in local and discontinuous colonies, sometimes, like in Afghanistan, at high altitudes, but always in brackish, salt-water or alkaline lakes (Cramp, 1977). Because of this highly precarious breeding habitat, the species demography is dependent of stochastic events, such as fluctuations of water levels. For example, the prolonged drought in Afghanistan between 1998 and 2005 has certainly affected the breeding success of flamingos in Dasht-e Nawar, with Ab-e Nawar, the main body of water in Dasht-e-Nawar, going completely dry by the middle of summer. An additional threat to their breeding success is the increasing diversion of inflowing waters for irrigation and human uses, an indirect consequence of the large increase of the human population living around the basin since the 1970's (Petocz, 2006).

Harassment, hunting and egg collection of flamingos do not seem to be practiced by local people as Hazaras associate the pink colour of their plumage with the blood of the martyred prophet Imam Hussein (Shank & Rodenburg, 1977). Yet they heavily harvest other species of waterbirds during summer when they are in moult and unable to fly. This practice may indirectly disturb nesting flamingos. Recently, war in the country has had unexpected effect on the flamingo colony in the area. On 18 July 2009 a F15A airplane from the US army crashed not far from the breeding site of flamingos. When coalition forces sealed off the crash site, they disturbed the colony firing at least one rocket at it, perhaps to deter birds from flying towards helicopters. The colony was abandoned and we found dozens of dead unfledged chicks of Slender-billed Gulls *Larus genei*, Common Terns *Sterna hirundo* and Greater Flamingos when visiting the area 9 days later.

Dasht-e Nawar is one of the most striking arid highlands in Central Afghanistan, it is also one of the last sizeable wetland habitats between the Amu Daryah and Helmand river basins and is therefore of exceptional international importance as a stop-over site for migrating waterbirds from Central Asia. With the alarming information that Ab-e Estada suffers excessive water drainage, Dasht-e Nawar could very well be the last breeding haven for the Greater Flamingo in Central Asian highlands.

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Modification of Dahlgren's apparatus for crop draining of flamingos

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Introduction

The common method for collecting food samples from birds is to sacrifice them and analyze the gut content (Pullianen, 1968; Watson *et al.,* 1970; Newton *et al.,* 1974). Irrespective of the pros and cons of this method for studying dietary habits, sacrificing birds for such studies has been strongly objected (Ryan & Jackson, 1986) and considered unethical all over the world. Several non-lethal alternate methods for studying the dietary habits of birds have been developed (Duffy & Jackson, 1986; Ford *et al*., 1982; Ryan & Jackson, 1986). Dahlgren (1982) described a method for sampling food items from the crop of Partridge *Perdix perdix*. We modified the crop-draining device described by Dahlgren (1982) to study the food habits of Lesser Flamingo *Phoeniconaias minor* and Greater Flamingo *Phoenicopterus roseus*, and successfully drained crop content of both the species without causing injury to the birds. This note aims to inform others of our successful application of the modified Dahlgren's device for crop-draining in long-necked birds like flamingos. This study was carried out at the saltpans of Bhavnagar, Gujarat, India during 5–9 May 2005.

Method

Draining the crop of flamingos has not been attempted before to our knowledge. Under the existing environmental law of India and the need to find non-lethal methods to study the crop content of flamingos, we modified Dahlgren's crop-draining device and evaluated its effectiveness for long-necked birds like flamingos.

Modified crop-drainer

The modified crop-drainer comprised two plastic syringes (50 ml capacity), one flexible plastic tube (external feeding catheter designed for the human stomach) of 1,020 mm length with 3.50 mm internal and 4.70 mm external diameter (the thick tube), one flexible thin plastic tube of 1,020 mm length with 2.50 mm external diameter (the thin tube, Figure 1).

The thick tube was attached to a syringe at one end and the other end was rounded and beaded to facilitate easy insertion of the tube into the oesophagus. Four perforations (with dimensions of 3.40 × 1.90 mm) were made in the last 70 mm of the tube and spaced to allow entry of food material from all directions (Figure 2). The thin tube was attached to a second syringe at one end and fused with the thick tube at the other end with synthetic material. Both the tubes were fixed to each other along their length with soft glue surgical tape.

The thick tube acted as a food suction tube while the thin tube pumped air and water into the crop in order to dilute food material and prevent shrinkage of the crop wall during suction.